

# AMPEX

## PORTABLE VIDEOTAPE RECORDER

## VPR-20B





# VPR-20B: It's Far More Than Just A Portable Acquisition Machine

The innovative VPR-20 has been refined in many areas to withstand the most demanding field environments. The result is the VPR-20B. The unique one-piece reel holddown has been strengthened and also reduced in weight by the extensive use of precision die cast and molded components. In addition, the reel drive servo system was toughened to provide greater performance with the wide range of videotape frictional characteristics present under field environment conditions. Also, visual changes were included in the VPR-20B to make it easier to thread under minimum lighting conditions.

The small, weatherproof VPR-20B is totally compatible with SMPTE or EBU Type C one-inch helical VTRs. This machine was created to be a tough, easy to use, and simple to maintain field acquisition VTR offering an added full studio "workhorse" editing and production capability, unmatched by any other portable VTR.

## Ampex: No. 1 in VTRs

Ampex introduced the first practical videotape recorder in 1956, and the company has been a leader in recording technology ever since. The

VPR series of recorders has rapidly established itself as the premier VTR of the broadcast industry. Popular family acceptance of the Type "C" format in the worlds of entertainment, industry and education has increased worldwide use of the Ampex VPR series recorders.

## VPRs Surround The TV World

Today, there are more Ampex VPRs in worldwide service than any other broadcast recorder in existence. Most major international TV networks use VPRs for sports and news coverage. In 1978, Ampex received two Emmy awards — one for the Ampex AST\* automatic scan tracking system and a joint honor for developing SMPTE Type "C" format VTRs. The Royal Television Society of the U.K. presented its 1979 Geoffrey Parr award to the AST development team.

## VPR-20B: Kin To The VPR-2

The Ampex portable VPR-20B possesses all of the same fine engineering qualities found in the acclaimed VPR-2. The VPR-20B lets professionals do many things they used to have to wait for until the production team returned to the studio.

Simple automatic backspace editing is supplemented by a unique dual search and cue servo system. Exclusive editing features permit faster recueing and locating of recorded segments.

The VPR-20B can save even more time and money by its ability to provide full color playback directly to a variety of monitoring equipment.

## Finish In The Field

The VPR-20B is the only full-featured Type C portable that lets field productions move directly to *finished* productions while the crew is still on location.

## FEATURES:

- **Rugged, weatherproof and dustproof packaging**
- **Unique full function remoteable control panel**
- **Unique camera interface connector permits *Tape Remaining* and *Low Battery* displays to be shown in a camera viewfinder**
- **Playback video confidence simultaneously with record**
- **Automatic backspace assemble editor**
- **Switchable re-cue to the beginning or the end of the last recorded segment employing built-in electronic tape timer**
- **Advanced electronic circuitry and built-in test diagnostics using multiple custom LSI devices**
- **Operates in any position and while in motion**
- **Total interchange with SMPTE Type "C" (for 525 NTSC) and 625 one-inch EBU Type "C" highband helical scan recorders**
- **Flexible three-way power: quick change plug-in battery, external DC input, and AC power pack to permit use with standard AC power lines (it plugs into the battery compartment).**
- **Individually field replaceable video heads**
- **Electronic tape tension for gentle, yet precise tape control**
- **Simplified tape threading**
- **Optional internal SMPTE/EBU time code generator, color stabilizer and sync channel accessories**









# VPR-20B: A Reliable "Go-Getter" Even When The Going Gets Tough . . .



When the VPR-20 was refined to produce the VPR-20B, Ampex engineers knew today's portable VTR had to be rugged, easy to use and simple to maintain. They also knew it must be designed to produce the very finest quality recordings under the most severe environmental conditions—dust, sand, heat, or rain and snow. And the VTR had to get the job done from one end of the globe to the other on a normal day-in and day-out basis.

The VPR-20B was designed with the future in mind. It can take the kind of "hard knocks" that field operation can produce.

## **Built To Keep Pace**

The Ampex VPR-20B is built to take on a dizzying pace and keep its wits about it. This portable VTR is oblivious to the way it's held or positioned, and it has an amazing resistance to the kind of vibration and gyroscopic overloads which can occur under adverse conditions.

VPR-20B's powerful bi-polar reel and capstan servos enable the machine to record accurately and precisely under all manner of severe motion conditions. Laboratory shake table tests as well as practical bulldozer, helicopter, sleigh and motorcycle rides in the field have proven the Ampex VPR-20B's ability to take it.

## **A Strong Case To Support Tomorrow**

Environmentally, the VPR-20B is built to stand a lot of abuse. Its lightweight, rigid transport lets the operator keep working confidently in a variety of weather conditions. The VPR-20B's main operating controls are located behind a sliding transparent door that can be closed to prevent dust or moisture from entering the machine while it is functioning.

## **Location Shooting Without Worry**

With the Ampex VPR-20B, the operator never has to be concerned about missing any shots. On location, the crew always wants to know it's capturing good video material. The VPR-20B includes a special confidence feature which actually plays the picture back from the tape into the camera viewfinder *during recording*. This way, the cameraman knows "if it's in the viewfinder, he's got it all on the tape." And if color playback or confidence in the field is desired, an optional color stabilizer mounted inside the VPR-20B makes this possible, too.

## **Editing "On-The-Spot"**

The portable VPR-20B is something different. Its exclusive dual-cue tape timer and servo system combine with precision automatic backspace editing to let the operator accomplish rapid reviews, quick returns to initiate a new recording segment, and the replacement of bad takes or extraneous material.

## **Easy Head Replacement**

The VPR-20B is easy to work on in the field, too. Video scanner tips can be replaced in minutes right on location if required. The VPR-20B's head life is warranted at 1,000 hours, and its design has already proven highly reliable at work around the world today.

## **Power To Finish The Job**

Another big plus from the VPR-20B is its three-way power flexibility. The battery pack has more than enough capacity to record and rewind a full hour of program. And, when the operator is ready to shoot some more, the quick-change battery pack means the VTR is, too. The machine even has a battery/charger system to bring the system back up to full power again in less than an hour. The VPR-20B can be operated from external 12-volt power in a van, for example, with automatic VTR battery drain protection and automatic power switching when an external source is applied. The self-contained AC power pack plugs directly into the VPR-20B's battery compartment and allows the portable machine to run off normal AC power lines.

The VPR-20B's special "power-down" memory helps operators keep track of field production hour-to-hour and day-to-day. The memory keeps the VPR-20B tape timer/time of day counter operational during battery or power changes for up to two days, as required.



# It's Designed To Earn Its Keep Back At The Studio, Too

The Ampex VPR-20B is not a machine to sit idle on a shelf after the excitement of on-location shooting is over. Besides its many field recording and editing features, this multi-faceted VTR offers added refinements that professional broadcasters and production facilities need to realize higher efficiencies and improved economies.

For any professional broadcast or production house, the VPR-20B is a perfect work partner for an Ampex VPR series studio recorder. VPR-20B on-location footage can be played directly through an Ampex digital timebase corrector for immediate airing. No special playback accessory unit is required. Field material can be easily edited in using the VPR type "C" special effects for a more powerful production system. The smooth transition-free slow motion performance of the VPR series studio recorders compliments the VPR-20B without compromise in picture consistency or quality.

## A Portable for Studio Editing

The VPR-20B is too versatile a machine to stay an inactive editor around the studio. The VTR includes a built-in backspace editing system that uses cues in the tape timer and pulse circuitry to activate the recording function.

This cue system is provided at the start and end of each recording cycle. If the director says at the end of the recording: "I'd like to review that," the VPR-20B's search system allows the operator to respond quickly and easily to this common command. He need only to press "Cue 1" after the tape has automatically backspaced to "Cue 2" in preparation for the next edit. The machine will immediately move back to two or three seconds prior to the point where the last recording was initiated. This segment can now be played back, including the in-going edit, and evaluated for creative content by the director.

## Let's Do It One More Time

The Cue 1 function offers another desirable production editing feature. If a director doesn't like the last recording, he can tell the operator: "Let's do it over again." All the operator has to do is press Stop, press Cue 1 and then wait for the VPR-20B to re-cue again. He is now ready to begin recording and to make another edit, replacing the

undesirable material. This feature allows post-production to proceed more smoothly, without any confusing material and wasted footage.

## Even Mid-Segment Editing

Another unique editing feature with the VPR-20B is the ability to edit at any point within the previously recorded segment. The operator doesn't have to go to either the starting point or end (Cue points 1 and 2). In this way, operators can shoot a segment without being concerned that it ends exactly at the point of the next in-coming edit. When in the playback mode, the operator simply depresses both Cue 1 and 2 buttons at the same time. This moves Cue 1 from the start of the recording to a point in the tape where the operator pressed the two controls. This prevents extraneous video material from being used in error during a post-production session.

## Full Color Frame Edits

When used in combination with the very accurate video color framer, the VPR-20B machine's automatic backspace assemble editor can produce full color frame edits at the point where the previous recording was completed. This is normally associated with the use of high quality, RS-170A or EBU equivalent signal sources.

## VPR-20B: A Production "Workhorse"

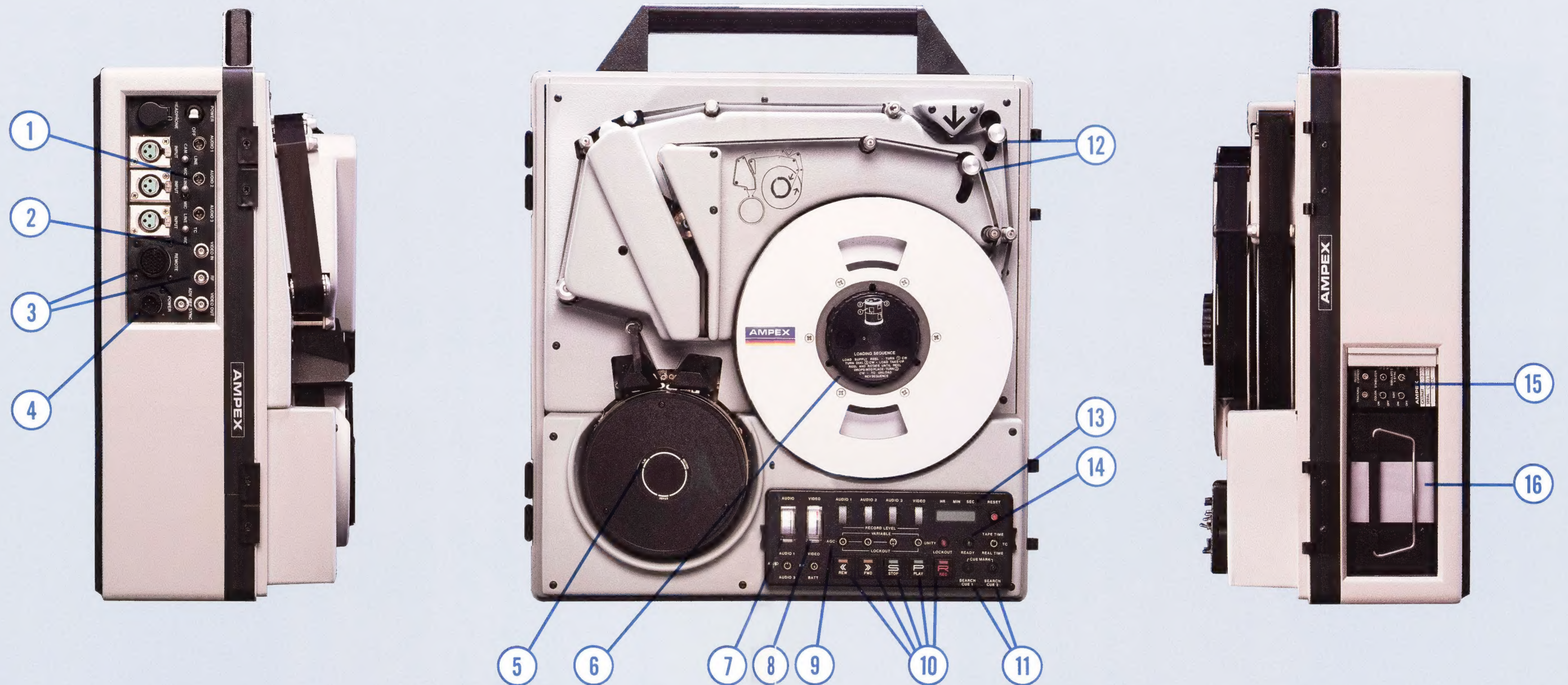
The VPR-20B provides a variety of production skills to any teleproduction team, including video delay and screening/review.

This highly versatile portable VTR can interface directly with an Ampex TBC for full studio synchronous playback with an output for dropout compensation. The VPR-20B also interfaces directly to studio audio with line level outputs.





# Anatomy Of Another Winning Product From Ampex



1. Line level audio outputs for all three audio channels provide easy system interface.
2. A video color framer comes on the VPR-20B as standard equipment for precise color frame referencing. The color framer is referenced to the video input signal.
3. Full capability I/O panel includes advance sync reference input and R.F. output, and provides a simplified interface with such optional accessories as the Ampex TBC-2B digital time base corrector.
4. External power connection will accept DC inputs, from 10-18 volts, from a vehicular power source.
5. Scanner mounter video playback head provides simultaneous off tape monitoring as the recording is taking place.
6. Reel holddown provides positive reel attachment without the use of removable parts.
7. Audio meter is switchable to any of the three audio tracks and average or peak display is internally selectable.
8. Video level, R.F. playback from playback head and battery status are switch selectable on a second meter.
9. The VPR-20B features switch selectable variable or automatic gain control (AGC) for each audio track. In addition, any audio or video may be inhibited from recording.
10. Logically arranged, labelled and illuminated functional controls on the main control panel assure rapid, error-free recording and playback.
11. An advanced dual-cue tape timer for professional assemble edit recording lets the operator go back and look at the last shot, and either go on from there, or retake the shot and replace unwanted material.
12. Easy tape threading and electronically controlled tape tension for gentle and precise control even during gyroscopic movement or excessive vibration.
13. Back-lit LCD tape timer displays tape time, time code and 24 hour real time clock.
14. "Ready" control provides independent control of the scanner for reduced power consumption.
15. Secondary control panel, next to the VPR-20B battery compartment, provides easy access to the machine's optional color stabilizer controls, editor on-off, and tracking and recording current adjustments.
16. Three-way power capability with a standard battery pack to drive the tape for a full 60 minutes without interruption... the fast-change companion AC power supply may be inserted in place of battery and run from normal AC power lines.



# The VPR-20B . . . It Lets You Work With Supreme Confidence

In keeping with the philosophy that the VPR-20B is much more than just an acquisition machine, here are just a few of its remarkable operating features:

**Simplified Design For Easy Service:** The back cover of the VPR-20B portable removes to permit fast, easy access to hinged printed circuit boards. The book-page mounting of the boards will allow easy separation to provide access to both sides. The transport trim provides easy access to tension adjustments.

**Advanced Electronics:** The VPR-20B uses highly advanced custom LSI technology to deliver the most machine for the price. The unit's special, built-in test diagnostics warn of operational problems and simplify service and maintenance, if required.

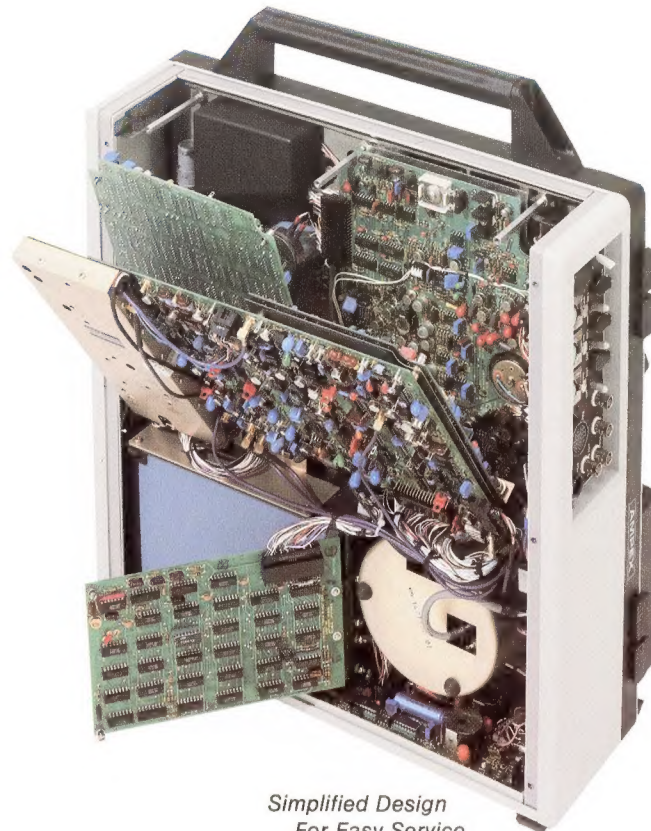
**Unequaled Motion Performance:** A weakness of many portable VTRs is an inability to compensate for rapid motion around the rotational axis of the machine's scanner and reels.

The VPR-20B's special servo system has been designed to counter gyroscopic and vibration interference. This system features bi-polar drive technology and improved drive components for increased performance under extreme environmental conditions. The machine is able to withstand near-instantaneous rotation of up to 40 degrees around the tape path of the VTR without disturbance.

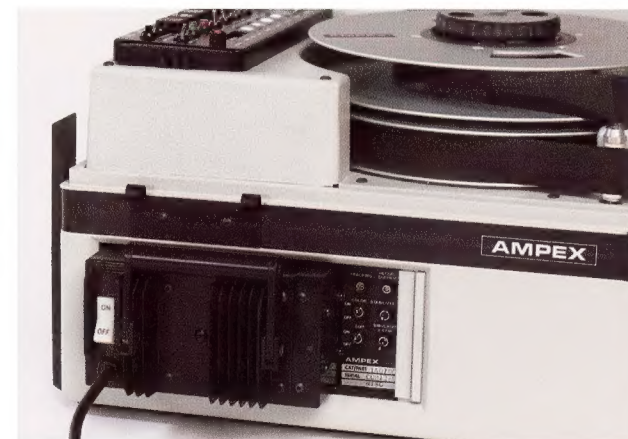
**Color Framing Comes As Standard:** The VPR-20B offers the operator full studio color framing right in the field. Perfectly timed, true color frame referencing is possible in just half the time associated with other VTRs using an additional "color pulse" connector.

**Flexible Power Choices:** The VPR-20B operates from internal battery power for 60 minutes, from a 10-18 volt external battery for use in mobile vans, and from the self-contained, plug-in AC power pack permitting operation from standard AC power lines. The application of an AC power supply that fits right into the machine eliminates the need for bulky external power supplies or troublesome cabling and connectors. The VPR-20B's regular battery does away with dangling lines and plugs, and any operator can change a battery in only 15 seconds.

When using the external DC supply, a relay automatically disconnects the internal battery system to avoid any accidental battery drain when the VPR-20 is powered by a vehicle.



Simplified Design  
For Easy Service



Flexible Power Sources



Secondary Control Panel



Dual-Cue Editing



Remote Control Capability

**Three Choices Of Video Monitoring:** While on location with the VPR-20B, monochrome monitoring is standard. If the operator wants color, an optional internal color stabilizer can be easily added. With this versatile option, gathered video footage may be easily screened at the end of each day by simply using any TV receiver (both video and audio).

**Scanner For Instant Video Review:** With a VPR-20B, the operator never has a doubt about the quality of the videotape material recorded. Ultimate confidence is possible through the use of a scanner-mounted video playback head. This bonus feature provides simultaneous off-tape monitoring as the recording is taking place, and easy video set-up besides.

**Dual-Cue Editing:** Our exclusive dual-cue editing gives you studio-type control. Four edit-related functions give you the edge: From "let's see it" reviews, and precise returns to the next edit point, to total control when replacing undesired material, and even mid-segment edits to new material.

**The Tape Stays In Top Shape:** LED-lit tape motion controls on the VPR-20B interlock by priority, making them virtually "fool-proof." Proper operation of the "C" format requires precise control of tape tension, and to accomplish this in any position the tension control assembly of the VPR-20B has been designed as a balanced assembly, independent of gravity. Special circuits in the drive system provide a "Near-End-Of-Tape" signal to prevent accidental loss of tape from the supply reel. This feature can be easily overridden for fast tape removal or for "tails-out" storage.

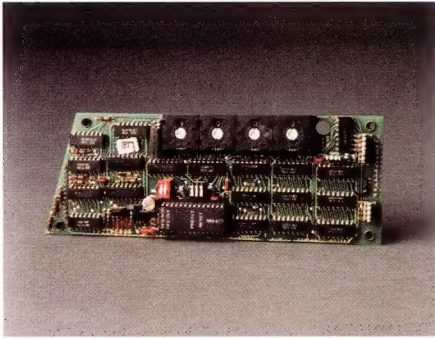
**Simplified Tape Threading:** Tape threading on the VPR-20B is simplified by a thread servo that permits an automatic payout of the tape as it is needed to prevent coming up short at the takeup reel. This operational feature is halted instantly after threading, by touching any function control.

**A Remote Control Capability:** Remote control with the portable VPR-20B comes two different ways. The first involves the entire main control panel which can be remotied up to 100 feet from the VTR machine.

In the second remote application, the VPR-20B is interfaced through a remote connector. Connections can be provided for all tape motion controls, for audio and video signals, and VTR indications to and from a camera, and for controlling a digital time base corrector.



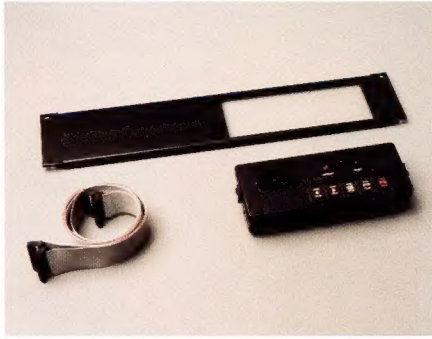
# Options and Accessories



## **SMPTE Time Code Generator:**

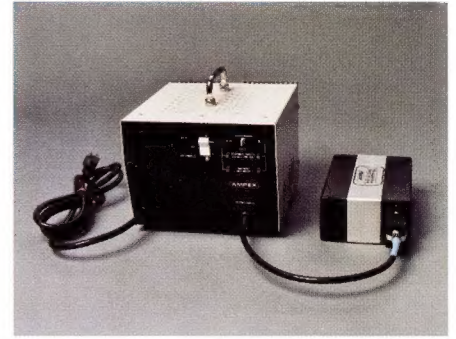
This provides a source of SMPTE/EBU time code which can be recorded on the Audio 3 channel. It has a variety of operator selectable modes, presetting of hours and minutes, and the ability to reset to zero when the power is turned on with time code or tape timer selected on the display control. It will also reset to "real time" when power is turned on in this display control position.

In addition, day/date information or reel identification numbers can be recorded in the time code "user bits".

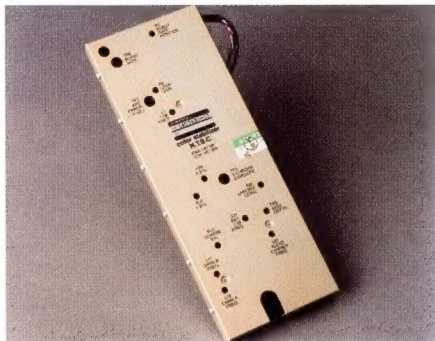


**Remote Panel Adapter:** This permits the main control of the VPR-20 to be replaced by a basic panel and main control located at distances of up to 100 feet away.

**Sync Kit:** This kit provides the optional Type "C" format recording capability throughout the vertical sync interval. Three dummy heads in the scanner are replaced with active sync heads. (Not shown).



**Fast Charger:** This permits the fast-charge battery pack to be recharged in 40 minutes. The fast-charge battery pack is made up of NI-CAD cells which have been computer matched with regard to their individual charge and discharge characteristics. These matched cells, when charged with the unique charging principle in the fast charger, result in a system which exhibits long battery cycle life and minimizes NI-CAD "memory" problems.



**Color Stabilizer Module:** This provides color video for recording confidence or off-line editing. A color stabilizer may be used for color video playback when use of a time base corrector is impractical or unnecessary. Output is provided for a video monitor or standard color TV. Audio #1 can be added in the R.F. mode for both audio and video playback through the antenna input.



**Digital Time Base Corrector (TBC-2B):** This enables the VPR-20B to provide broadcast quality video in normal playback. The TBC-2B itself offers several options including: a dropout compensator that replaces missing video information with material from a previous correctly phased line, a velocity compensator that can reduce time base errors during each horizontal line, and a heterodyne color processor for operation with small-format VTRs, such as 3/4-inch.



**Shipping Cases:** These rugged cases provide protection for the VPR-20B and its accessories. The recorder case may be shipped with either a battery pack or the A.C. adaptor in place. The accessory case has compartments for the battery charger, four batteries and five reels of tape. The cases are foam-lined and all external hardware is recessed to prevent damage in shipment.



# Specifications

Video and audio specifications are based on replay on VPR-2B

## VIDEO AND SYNC

	NTSC 525/60	PAL/SECAM 625/50
Bandwidth	Flat to 4.2 MHz $\pm$ 0.5 dB -3 dB at 5.0 MHz	Flat to 5.0 MHz $\pm$ 0.5 dB -3 dB at 6.0 MHz
S/N (Rhode & Schwarz unweighted with bandpass filter Demodulator video output)	-46 dB peak-to-peak video to rms noise on interchange basis	-43 dB peak-to-peak video to rms noise on interchange basis
LF Linearity	2% blanking to white (maximum)	2% blanking to white (maximum)
Differential Gain	4% blanking to white (maximum)	4% blanking to white (maximum)
Differential Phase (40 IEEE units of subcarrier thru TBC)	4° at 3.58 MHz off-tape (max)	4° at 4.43 MHz off-tape (max)
Chrominance/Luminance Delay	20 n sec (maximum)	25 n sec (maximum)
2T sin <sup>2</sup> pulse & bar	1% K-factor maximum	1% K-factor maximum
Moire	-40 dB color bars 75% amplitude 3.58 MHz sub-carrier	-36 dB color bars 75% amplitude 4.43 MHz subcarrier

## AUDIO (Channels 1, 2 & 3)\*

Frequency Response (400 Hz Ref) 100 nWb/m	$\pm$ 1 dB 500 Hz to 10 KHz $\pm$ 2 dB 50 Hz to 15 KHz
S/N with respect to 8 dB above reference level	-56 dB Audio 1 & 2 -50 dB Audio 3
Distortion (measured at 1 KHz) @ 100 nWb/m reference level (+8 dBm) @ 251 nWb/m peak level (+16 dBm)	1% maximum 3% maximum
Depth of Erasure on its own recording	-70 dB
Wow & Flutter (NAB unweighted)	0.15% rms
Crosstalk (Audio 1 & 2) 1 kHz referenced to +8 dBm or 100 nWb/m	-50 dB maximum

## SIGNAL INPUTS

Video (75 ohms) BNC Connector	0.5 to 2.0 Volts peak-to-peak
Audio Switchable Line/Mic, channels 1 & 2	
Mic:	-60 dBm minimum @ 200 ohms -20 dBm maximum
Line:	+8 dBm nominal @ 50 k ohms bridging +24 dBm maximum -20 dBm minimum
All 3 channels independently switchable from manual level/ AGC/Record Inhibit	Meter jumper selectable VU or PPM
	Audio 3 input switchable line/mic/optional internal time code generator

## SIGNAL OUTPUTS

Video 75 ohms BNC**	1 Volt peak-to-peak
Audio Monitor Output Channels 1, 2, & 3	+8 dBm to drive 600 ohm balanced isolated inputs
Maximum Output	+16 dBm
**Video output with optional color stabilizer provides a video/audio one modulated VHF RF signal.	two channels adjusted for 61.25 & 67.25 MHz
	two channels adjustable 50 to 100 MHz

## GENERAL

Weight: including battery pack and 60 minute reel	24 kg; 53 lbs
Record Time	60 minutes with 9" reel
Rewind Time	4 minutes max. 1 hour reel
Battery capacity	up to 70 minutes
Tape Speed (Nominal)	<b>525</b> 9.6 in/s
Video Writing Speed (Nominal)	<b>625</b> 9.44 in/s
Carrier Frequencies	1009 in/s 842 in/s
Audio Equalization	7.9 MHz blanking level 10.0 MHz peak white
Record Lock-up time (editor on) from ready (editor off)	7.68 MHz blanking level 8.9 MHz peak white
Scanner Run-up	15 microseconds 3180 microseconds
	15 microseconds
	2-3 seconds .75 seconds
	2-3 seconds .75 seconds
	4 seconds

## TEMPERATURE & HUMIDITY

TEMPERATURE	0-45°C
HUMIDITY	10%-90% RH (non-condensing)

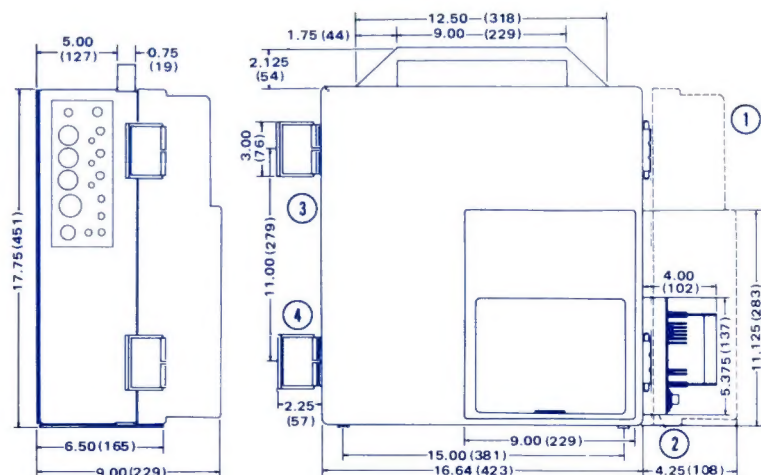
## POWER REQUIREMENTS

For AC operation:	50/60 Hz, single 105/115 Volts AC at 1.5A Nominal 210/230 Volts AC at 0.75 A Nominal
For external DC Operation:	10-18V, 75W Nominal, Record Mode

## PHYSICAL DIMENSIONS

### NOTES:

1. Cover shown open 90° for tape loading.
2. AC power pack shown installed. Battery pack is flush. Allow additional 9 inches (229 mm) for removal of either pack.
3. Allow 4 inches (102 mm) on left side for cables and connectors.
4. Snaps shown open. Snaps extend 0.375 inches (10 mm) when shut.



\*Audio 3 Channel is used for Time Code if selected  
**Ampex reserves the right to make product and specification changes at any time without notice.**



# VPR-20B: Part of a Fine Family



The VPR-20B is only one member of a distinguished and growing family of superior video products from Ampex. Together with the VPR-80 and VPR-2B 1" videotape recorders, the BCC-20/21 Digicam™ cameras, and the TBC-2B time base corrector, the VPR-20B

rounds out a modern video crew to meet any challenge of the '80s. This is the completely compatible solution for attaining high performance on location and in the studio — day after day — in a professional, cost-effective manner.

## Ampex Supports Its Products

Ampex video products are in use worldwide. Today, as in the beginning, Ampex serves all of its customers with experienced and responsive worldwide sales and service support. Ampex

provides thorough training, spares, documentation and maintenance. For additional information, contact your nearest Ampex sales representative.

# AMPEX

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